

**Before the  
FEDERAL COMMUNICATIONS COMMISSION  
Washington, D.C. 20554**

In the Matter of	)	
	)	
Implementation of Section 6001 of the American	)	GN Docket No. 09-40
Recovery and Reinvestment Act of 2009	)	

**EXECUTIVE SUMMARY OF THE NATIONAL ASSOCIATION  
OF TELECOMMUNICATIONS OFFICERS AND ADVISORS**

The Commission should only offer advice on those issues or areas where NTIA has specifically requested that the Commission lend its expertise and experience. Specifically, any advice that the Commission provides to NTIA should be limited in scope to those matters where consultation has been sought, and should be as concise and clear as possible so as to avoid potential applicant confusion.

NATOA respectfully asks the Commission provide guidance to NTIA that preserves local government's explicit role under ARRA while protecting the public interest considerations found in the Act itself.

For the purposes of NTIA's Broadband TOPS grant program, an area should be considered "unserved" by broadband where no wireline or wireless broadband connectivity is reasonably commercially available. This means consumers cannot purchase broadband service at rates comparable to those customers that are served or underserved. We propose that "underserved" is a function of five key considerations: Speed and capacity, affordability, accessibility, operator networks limitations, and last mile service over copper infrastructure.

We suggest it is more appropriate to define broadband in the context of supported applications. Within that framework, broadband is a connection that is sufficient in speed and capacity such that it does not limit a user's desired application. Thus, as users become more and more sophisticated, and applications become more and more bandwidth-intensive, the required speed and capacity of a given connection will need to continually increase to be considered broadband. This should also be framed aspirationally, in order to consistently provide for emerging uses and applications of broadband networks. The FCC broadband principles should serve as the absolute floor for non-discrimination and network interconnection obligations imposed on grant recipients, and should favor the deployment of open networks.

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**COMMENTS OF THE NATIONAL ASSOCIATION  
OF TELECOMMUNICATIONS OFFICERS AND ADVISORS**

**I. INTRODUCTION**

The National Association of Telecommunications Officers and Advisors (NATOA) submits these comments in response to the Public Notice regarding implementation of Section 6001 of the American Recovery and Reinvestment Act of 2009 (“ARRA”), released March 24, 2009.

NATOA’s membership includes local government officials and staff members from across the nation whose responsibility is to develop and administer communications policy and the provision of communications services for their respective communities. NATOA’s membership includes communities that have constructed, or are in the course of constructing broadband infrastructure, or are offering broadband services within their jurisdictions. These members manage networks in urban, suburban and rural areas across America.

**II. THE COMMISSION’S CONSULTATIVE ROLE**

In its Notice, the Commission specifically asks what consultative role they should play in relation to NTIA’s implementation of the broadband grant program created by section 6001 of ARRA.<sup>[1]</sup> As the Commission points out in this Notice, it has been given a consultative role under Section 6001(a) of ARRA on any matter which NTIA wishes to seek the advice of the

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<sup>[1]</sup> See *Comment Procedures Established Regarding the Commission’s Consultative Role in the Broadband Provisions of the Recovery Act (“ARRA Notice”)*, GN Docket No. 09-40, p. 2 (released March 24, 2009).

Commission. The Notice then proceeds to list five specific issues dealing with key definitional terms and the incorporation of the Commission's Broadband Policy Statement<sup>[2]</sup> into the non-discrimination and network interconnection requirements that will be part of any grant award.<sup>[3]</sup>

As an initial matter, NATOA would point to the Act's construction as guiding the Commission's role in implementation of Section 6001 of ARRA. NTIA is required to work "in consultation" with the Commission. "Consultation" means "the act of consulting,"<sup>[4]</sup> "consulting" takes its origin from the word "consult," which means "to seek advice or information from; ask guidance from," or "to refer to for information."<sup>[5]</sup> To that end, the Commission should only offer advice on those issues or areas where NTIA has specifically requested that the Commission lend its expertise and experience in a particular area.

Given the scope of Section 6001 and the need for regulatory clarity, the Commission should avoid providing unsolicited guidance to NTIA in areas where NTIA has not sought the Commission's assistance. We are concerned that confusion may arise and have a dilatory or negative effect on an applicant seeking grant funding from NITA. Specifically, any advice that the Commission provides to NTIA should be limited in scope to those matters where consultation has been sought, and should be as concise and clear as possible so as to avoid potential applicant confusion.

### **III. PROPOSED DEFINITIONS**

In response to the Commission's request for comments regarding the five key issues identified in the Notice, and in an effort to bring clarity and uniformity to a process that requires

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<sup>[2]</sup> FCC 05-15, adopted August 5, 2005.

<sup>[3]</sup> See *ARRA Notice* at pp. 1-2.

<sup>[4]</sup> "consultation." *Dictionary.com Unabridged (v 1.1)*. Random House, Inc. 13 Apr. 2009. <[Dictionary.com http://dictionary.reference.com/browse/consultation](http://dictionary.reference.com/browse/consultation)>.

<sup>[5]</sup> "consult." *Dictionary.com Unabridged (v 1.1)*. Random House, Inc. 13 Apr. 2009. <[Dictionary.com http://dictionary.reference.com/browse/consult](http://dictionary.reference.com/browse/consult)>.

these qualities, NATOA is providing the Commission with the same answers to these questions which it provided to NTIA as part of that agency's own independent proceeding. NATOA urges the Commission to provide guidance to NTIA which maintains the public interest considerations that are part of ARRA while preserving the explicitly granted role local governments have to play in improving America's lagging broadband standing.

*A. "Unserved" Areas Are Those Without Terrestrial Broadband Connectivity*

For the purposes of NTIA's Broadband TOPS grant program, an area should be considered "unserved" by broadband where no wireline or wireless broadband connectivity is reasonably commercially available. This means consumers cannot purchase broadband service at rates comparable to those customers that are served or underserved. While this definition leaves out satellite broadband service, it is important to note that satellite does not offer the same speed, capacity or scalability of terrestrial networks, and therefore should not be included for definitional purposes.

*B. "Underserved" Should Take Into Account Five Key Considerations*

Defining "underserved" to include service at very low speeds or capacity has significant adverse consequences for the driving purpose of the ARRA—to create American jobs as soon as possible. Implementation of low-bandwidth services, particularly those that utilize existing wireline infrastructure such as copper, will result in purchases of large amounts of equipment that is manufactured overseas. Such an approach will create many manufacturing jobs in China and few installation jobs in the United States. In contrast, high-bandwidth networks require installation and construction of new facilities, as well as development of new applications and services and equipment enabled by those facilities. As a result, high-bandwidth networks create many construction, research, and development jobs right here in the United States.

We propose that “underserved” is a function of five key considerations:

1. Speed and Capacity. Anything less than the international standard is underserved and represents a national concession to be satisfied with our ranking as 17<sup>th</sup> in broadband internationally. As Rep. Boucher noted in his recent testimony, competition that provides no real speed is just as emblematic of an underserved community: “Underserved can also refer to communities with inadequate broadband speeds. A community should not be disqualified from the program because there are multiple providers offering broadband with a download speed of just 256 or 512 kbps.”<sup>[6]</sup>

Even by setting the definition of underserved below the peak that cable claims DOCSIS 3.0 will deliver, we will be setting it near only the median level for some Asian countries. We urge the FCC, NTIA, and RUS to establish as its target the highest technically available speed and capacity, not a minimum standard that is not really “broadband” as it now exists in European and Asian countries.

Consider an example: as of this writing, the highest available residential speed in San Francisco (arguably, one of the most desirable markets in the world) is 10 Mbps downstream and 1.5 Mbps up—and these speeds are only available in one tenth of the city. For the rest of the city as of last fall, the highest residential speeds available from AT&T was its “Elite” Internet product—offering 6 Mbps downstream and 768 Kbps upstream. Comcast offered 8 Mbps down and 768 Kbps up, but only if the consumer purchased a bundle—other services as well as the Internet service. For an unbundled Internet product, Comcast would sell only 6 Mbps down and 384 up. These were the *best* services offered—and the priciest, affordable only for a few fortunate San Franciscans.

Compare these speeds to San Francisco’s competitor city Tokyo, where residents can buy approximately *100 times those downstream speeds and 1,000 times those upstream speeds*—for a lower price. And in China, massive attempts are underway to build networks with speeds of 10 GIGABITS per second—10,000 times the FCC’s definition of “broadband” and thousands of times the speeds available in the best “served” American cities.

2. Affordability. Even where high-speed, high-capacity service is available, communities are underserved if it is not easily affordable by low-income and middle-class consumers and small businesses. It may be that a carrier offers service of “up to” 20 Mbps upstream and 10 Mbps downstream, but at a price of \$140 per month to a residence and even more to a small business, with a minimum commitment of two years of payments, those services effectively do not exist for most Americans, even those in “served” areas. This increasingly standard price is a bar to service, and to broadband adoption, anywhere in the country.

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<sup>[6]</sup> See Statement of Congressman Rick Boucher, Subcommittee on Communications, Technology, and the Internet, Oversight of the American Recovery and Reinvestment Act: Broadband, April 2, 2009, [http://energycommerce.house.gov/Press\\_111/20090402/boucher\\_open.pdf](http://energycommerce.house.gov/Press_111/20090402/boucher_open.pdf), p. 2.

Three large member communities of Respondents conducted extensive, statistically accurate research of their residents and businesses in the summer of 2008. The economists who analyzed the resulting data determined that high bandwidth services would see their greatest uptake at \$40, and that interest in high speeds drops off at higher prices. This figure is based on a cross-section of the community and is not indicative of willingness to pay for a digital inclusion product among low-income consumers. The 2008 market research suggested that the willingness of low-income consumers (defined as a household of four with less than \$ \$33,075 per year in income)<sup>[7]</sup> to purchase high-bandwidth broadband would peak at \$20 and then decline at prices above that amount.

From a digital-inclusion perspective, affordable broadband must be a service that all households can afford regardless of income. Consider that consumers in various Asian and European countries enjoy 100 Mbps symmetrical service for \$40 per month. In contrast, in most American cities, counties, and towns, \$40 buys speeds that are 94 percent slower in the downstream direction and 99.3 percent slower in the upstream direction.

Affordable rates and the resulting greater adoption of broadband services have importance beyond social equity. They will also lead to enhanced network performance and innovation. Robert Metcalfe posited the widely-accepted notion that the value of a network increases as the square of the number of its users. In other words, for each new user who joins a network, the total number of interconnections in the network—and therefore its overall communicative potential—increases by the number of current users. This is another reason why it is important that we develop a network that is accessible, affordable, open and ubiquitous: so that it will appeal to the maximal number of users.

We strongly urge that affordability be a major factor not only for determining the merits of each grant application, but also for determining whether or not a particular community is underserved.

3. Accessibility. Even where service is available, communities are underserved if it is not readily accessible. For example, even where it appears that technologies have been deployed, consumers may not be able to acquire it, even if they can pay. Residential and business consumers, even in major urban areas are often unable to obtain DSL at their premises even though their neighbors can. The situation is caused by three key conditions. First, a given area may be DSL-capable but all circuits configured to support DSL in the area are used. Second, a given area may be DSL-capable but all the DSL capacity is used. Third, circuits configured to support DSL may be available but the copper plant extending to a given premises is not capable of supporting the DSL. Cable modem coverage also has accessibility issues. Cable-television plant was originally installed to serve residential customers and cable's traditional footprint thus does not stretch into business areas. Businesses not near residential neighborhoods are often not equipped with the infrastructure to support cable modem service.

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<sup>[7]</sup> The poverty guidelines were published by the U.S. Department of Health and Human Services in the [Federal Register](#), Vol. 72, No. 15, January 24, 2007, pp. 3147-3148.

4. Use not limited by network operators. Even where service is available, communities are underserved if use of the service is limited or manipulated, by network operators or providers, for political or commercial factors. For example, a consumer is underserved if the operator offers only an asymmetrical service that precludes operation of a home-based business, degrades full-motion video, or precludes distributed, collaborative development of media or software code. Similarly, a consumer is underserved if an operator has built a network capable of high, symmetrical speeds, but chooses not to sell services at those symmetrical speeds.

5. Communities served by copper based last mile landline networks should be included within the definition of underserved for the following reasons:

i. We are concerned that communities where DSL or cable modem service is available not be automatically considered “served.” The assumption that these networks deliver adequate broadband service is grossly incorrect. Cable’s Hybrid Fiber/Coaxial (HFC) networks and the phone companies’ DSL counterparts are unable to keep pace with growing bandwidth demand. They offer theoretical maximum speeds, which are always subject to network congestion and distance limitations and often not in fact available to subscribers.

Many communities around the country served by these networks, including several major metropolitan areas, are very concerned that their residents and businesses will fall behind other areas of the country and communities in Asia and Europe that are building next-generation fiber-to-the-home networks. They fear that their residents and businesses will be unable to take advantage of new and emerging applications made possible by next generation networks. For this reason, they already have plans in place to build fiber projects in their communities but lack the financial resources. These communities should be given the opportunity to meet their communications needs and make the strategic investments necessary to ensure their competitive status in the global economy.

The cable and telco networks were designed as single purpose networks for video and voice, respectively. They were not designed for the high capacity symmetrical applications that are emerging—and that have already become the lifeblood of American commerce, community life, and democratic participation. While cable and telco engineers have taken incremental steps to prolong the life of these networks, they will eventually become “tomorrow’s bottlenecks,” as a 2002 study by the Department of Commerce predicted.<sup>[8]</sup>

ii. The speeds advertised by carriers are theoretical and are seldom achieved. For example, in the case of cable, despite the improvements of DOCSIS 3.0, which cable operators are touting as capable of providing 100 Mbps and more, the fact remains that users must share that available bandwidth to each node. The actual speeds

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<sup>[8]</sup> “Understanding Broadband Demand: A Review of Critical Issues.” Office of Technology Policy, U.S. Department of Commerce, September 23, 2002.

realized by each user will be a fraction of that speed particularly during peak usage times. To put this in perspective, a 2008 technical audit of the Comcast cable system in Seattle revealed that on average 900 homes are passed per node. Assuming a penetration rate of 50 percent, 500 users would share the available bandwidth at each node. The more users log on simultaneously, the slower the Internet connection. This is why cable companies must always qualify quoted speeds as “up to.”

In the case of phone company networks, DSL and ADSL2+ networks can reach theoretical maximum speeds of “up to” 24 Mbps downstream under ideal conditions (and after substantial monthly payments by subscribers). However, speeds decrease the farther a residence is located from the Central Office (CO) or a multiplexer in the field. Actual speeds are a fraction of the advertised speeds, particularly as one gets further from the CO, and upstream speeds are usually below 1 Mbps at best.

iii. The services offered over DSL and cable lack symmetry or robust upstream bandwidth. Cable’s HFC technology is almost all downstream. The cable operators still dedicate only about five percent of their available spectrum to upstream transmissions. Their network configuration has been likened to an alligator: big mouth and small ears. By design, in order to deal with the limited capabilities of copper wiring, DSL, ADSL2+ and other variants are high asymmetrical. They are based on the copper transmission technology of the 19<sup>th</sup> Century and are simply unable to scale to provide the high symmetrical speeds required by businesses and consumers today. Indeed, much of the old copper plant used by phone companies for last mile connections will not support high bandwidth because the twisted pair copper connections to the home are aged.

### *C. Broadband Should be Defined Aspirationally*

America’s local governments recognize broadband as critical infrastructure – a utility that is essential to economic and community development. And we recognize that greater speeds and capacity are required than the American private sector has been willing to deliver. In 2006, YouTube alone consumed more bandwidth than did the entire Internet in 2000. According to John Chambers, CEO of Cisco Systems, video and online collaboration will drive network traffic to an annual growth rate of between 300 and 500 percent over the next several years. Our definition of broadband must keep pace with the current extraordinary growth of Internet use, must account for (and enable) future growth and innovation, and must enable the United States to



compete with nations abroad that have far outpaced us in their deployment of high capacity broadband.

The Federal Communications Commission (FCC) has increased the speed at which a given Internet service is considered to be broadband. The new definition includes a service that delivers a burstable speed of at least 788 Kbps in at least one direction. Although this is a substantial increase over the FCC's previous definition (200 Kbps) it is still not adequate, and cannot be considered even close to "broadband" as defined by European and Asian standards. This definition does not recognize the need for symmetry of data rates (i.e., download and upload speeds) and the substantial requirements of many current applications.

We suggest it is more appropriate to define broadband in the context of supported applications. Within that framework, broadband is a connection that is sufficient in speed and capacity such that it does not limit a user's desired application. Thus, as users become more and more sophisticated, and applications become more and more bandwidth-intensive, the required speed and capacity of a given connection will need to continually increase to be considered broadband. Supporting telework and other bandwidth-intensive initiatives for residential and small businesses customers currently requires a connection of at least 10 Mbps symmetrical and, realistically, 20 to 35 Mbps symmetrical in order to use today's applications. For enterprise and other power users a 1 Gbps service is required. This approach also provides a level of technological neutrality that allows for the deployment of wired or wireless networks depending on the real and evolving needs of a community. For example, this approach gives an underserved inner-city community the ability to deploy ad hoc wireless networks as a means of leveraging existing community resources while concurrently working on adoption and computer literacy programs that help drive demand for the kinds of applications discussed above. In

essence, you allow for the provision of a broadband gateway while users begin to understand the power of broadband connectivity.

The term “broadband” was popularized in the late nineties with the introduction of cable modem and telco DSL service. It was used primarily to distinguish these services from dial-up Internet access over telephone lines. So in reality “broadband” has come to mean a communications service that has only two distinguishing elements: always on (as opposed to dial up), and any speed greater than that of dial-up modems (56 kbps).

The problem with this understanding is that almost any level of current connectivity can be advertised as broadband regardless of the applications that are enabled. There is no distinction between connecting over a public Wi-Fi network to download a web page or engaging in video conferencing in High Definition over a fiber-to-the-home network. The former application requires about 200 kbps but the latter requires about 20 Mbps symmetrical. However, both are said to be using broadband.

To arrive at any useful definition of broadband we must link the speeds offered to the applications enabled. In our view, to be considered broadband a service should:

- Aspire toward and be scalable to the international standard for data communications: 100 Mbps to 1Gbps symmetrical, with scalability in the next decade to 10 Gbps, also an emerging international standard.
- Have high speeds capable of supporting integrated voice, video and data applications.
- Be measured by speeds actually experienced by the end users during peak times -- not the theoretical “up to” speeds advertised by most providers.
- Have symmetrical connections or at least robust upstream speeds to facilitate interactivity. Every person is not only a receiver of information but potentially a producer. If Americans are to be developers and creators as well as consumers, symmetrical service is imperative.
- Ensure high reliability and low latency.

- Enable innovation and transformative breakthrough interactive applications such as full motion HD video conferencing, real video-on demand, "virtual" education and healthcare.

Top quality interactive video – the kind that enables educational applications, aging-in-place, rural telemedicine, and carbon-reduction through telework -- requires 22 to 25 Mbps in both directions. Broadband technologies should be scalable from those levels. Services not meeting that standard provide high speed Internet access but lack the bandwidth to enable the distributed development, collaborative innovation, and data-intensive interaction that are hallmarks of the global economy – and that are necessary for the United States to compete with our competitor nations in Europe and the Pacific Rim.

High-bandwidth broadband is widely-recognized as a key driver of future economic competitiveness, and is also regarded as a facilitator of political discourse and activity—the most important medium for communication and expression of political ideas since the advent of television. High-bandwidth broadband can:

- Facilitate democratic and free market values, by facilitating an open, standards-based Internet platform for all who wish to innovate, compete, and serve the public over the network.
- Enhance digital inclusion by facilitating affordable access to this incomparable enabling resource for community groups, students, the elderly, and vulnerable populations.
- Facilitate economic development by
  - Creating jobs and the enhanced, multiplied economic activity that accompany jobs
  - Enabling small business creation and growth
  - Enabling “in-sourcing,” in which local businesses hire local workers to provide broadband-based services from home—rather than outsourcing to foreign countries
  - Supporting businesses with very high bandwidth needs, such as digital media and software development
  - Enabling workforce education
  - Enabling telework and distributed work
  - Promoting development and revitalization zones
  - Facilitate on line collaboration and organization

- Enhance education and technology education by creating communications among schools and between schools and other institutions such as Universities, programmers, and social service agencies.
- Provide a highly reliable, resilient backbone for wireless services—improving performance and capacity through fiber “backhaul.”
- Support current and future public safety and government communications systems—saving communities the enormous, unending cost of leasing circuits, and simultaneously providing a higher-quality, higher-capacity, more reliable, more secure transport for key City users such as law enforcement, fire, emergency management, and public health.
- Facilitate interoperable communications among neighboring jurisdictions.
- Promote private sector competition, by providing a platform for numerous competitors to quickly and inexpensively enter markets (without having to build their own, duplicative networks) and offer competing, differentiated broadband services and access.

*D. The FCC’s Broadband Policy Statement Should be a Definitional Floor, and NTIA Should Favor Open Networks*

The FCC broadband principles should serve as the absolute floor. Adherence to these principles should be a requirement but we must do more. The principles are not currently enforceable and do not bar network owners from discriminating in favor of their proprietary or affiliated content applications and services. Non-discrimination is vital to the future of the Internet. Network owners should not be allowed to discriminate in terms of content transport or unnecessarily interfere in communications between end points on the network. Where packet prioritization is deemed necessary to optimize certain applications network owners must provide similar transport terms to all providers of like services. We note that many current network management practices that lead to the throttling of some communications are a function of inadequate bandwidth. Simply put, many existing networks that rely on copper connections lack the capacity to support today’s Internet, where the growth of two-way video communications is exploding and users are becoming creators and distributors of content, applications and services.

Many of these services will compete with services offered by the network owner. In this context, without strong guarantees of neutral treatment for all users and content providers, network owners have every economic incentive to favor their own content and services. We

have recently witnessed such behavior in a number of circumstances. The mere threat that a new service could be thwarted by the network owner will have a chilling effect on innovation and inhibit research and development. This is another reason why we urge the NTIA to direct grant monies to projects that aim to expand the capacity of networks and that allow service provision by independent entities on non-discriminatory terms.

Despite protestations from certain quarters, non-discrimination and openness are not new concepts; without them the Internet would not have been possible. In the early days of ARPANET researchers were able to use the underlying connectivity available through the phone network to transport data packets among connected computers. They had access to the phone networks because the networks were regulated as common carriers and subject to open access rules. In essence you had network neutrality. The Internet became so successful because anyone could use the network to communicate with other network endpoints, unfettered by any unnecessary mediation from the network owner. This is what is referred to as the end-to-end principle of the Internet. Cable and phone networks were originally designed as single purpose networks to provide respectively: one way video distribution and voice service. If you wanted cable or voice service you needed to buy it from one of the network providers since the service and the network were parts of an integrated whole. Their network architectures were predicated on the provision of these services. A rough analogy is a grandfather clock where the arms, weights, pendulum, gears and pulleys work together to provide a single application: the time.

The introduction of Internet Protocol changed that. IP decoupled the application from the transmission medium. Today's Internet applications and services are determined by the software and hardware of the users residing at the network edge.. Because its design is not predicated on any specific service the Internet will give rise to many new services as users experiment with the

available bandwidth and create new services and applications and solutions to address their individual, community or business needs. The potential uses of the Internet are limited only by the imagination. Some opposition to network neutrality is really about putting the Internet genie back in the bottle. NTIA should favor open networks

It is expensive – perhaps prohibitively so - to build multiple networks in one community. Thus the owner of the first and therefore dominant network can set unfair terms and prices for others to use it. On the other hand, multiple service providers who can compete over a common platform will fuel innovation in broadband services, which will benefit local communities and society. Thus structural or regulatory measures must be employed to protect the right to non-discriminatory access to networks for all competing service providers and to forestall unfair business practices by network owners. We recognize that private network developers must be able to seek a realistic return on investment. This is consistent, however, with providing access on non-discriminatory terms. We urge the NTIA to focus on projects that allow service competition over a common infrastructure. We will never know what is possible with the Internet or be able to fully exploit its potential until we have active competition at the service layer. Vertical integration of transport and content does not make sense in the Internet age and is a barrier to competition and innovation.

#### **IV. CONCLUSION**

NATOA respectfully asks the Commission provide guidance to NTIA that preserves local government's explicit role under ARRA while protecting the public interest considerations found in the Act itself.

Respectfully submitted,

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April 13, 2009